

Notice of Allowability

Application No.

10/690,315

Examiner

Asok K. Sarkar

Applicant(s)

YOO, WOO SIK

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to case filed 10/20/2003.
2. ☒ The allowed claim(s) is/are 1,2,4-14 and 16-20.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

EXAMINER'S AMENDMENT

1. In view of allowable subject matter, the Applicant's representative was contacted to amend independent claims 1, 11 and 18
2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Alan MacPherson on July 9, 2004.

The application has been amended as follows:

↓
Cancel claims 3 and 15.

In claim 1, line 9, following the phrase "... chamber to", insert - - a temperature up to between about 700°C and 1300°C - -.

In claim 11, line 24, following the phrase "... annealing temperature", insert - - , wherein said annealing temperature ranges from between about 700°C and 1300°C - -.

In claim 18, line 20, following the phrase "... second temperature", insert - - up to between about 700°C and 1300°C - -.

In claim 20, line 27, following the first occurrence of the word "second", insert - - temperature - -.

Allowable Subject Matter

3. Claims 1, 2, 4 – 14 and 16 - 20 allowed.

4. The following is an examiner's statement of reasons for allowance:

Claims 1, 2 and 4 – 10 recite, inter alia, an ashing method comprising providing a substrate having a resist layer and implanted elements, and placing said substrate into a first processing chamber; introducing substantially pure oxygen into the processing chamber at a first partial pressure above 100 Torr and varying the temperature of the internal environment of the first processing chamber to a temperature up to between about 700°C and 1300°C to cause the oxygen to oxidize the resist layer to remove the resist layer from the substrate. Sang – Hun, "Application of Atmospheric Torch Plasma to Resist and Polymer Removals", Proceedings of the Symposium on Dry process, Tokyo, p. 103 – 108, Nov (2000) teaches a resist oxidation method with pure oxygen at atmospheric pressure, but fails to teach varying the temperature of the internal environment of the first processing chamber to a temperature between 700°C and 1300°C. Additionally, the art of record does not disclose or anticipate the above limitation in combination with other claim elements nor would it be obvious to modify the art of record so as to form a device including the above limitation.

Claims 11 – 14, 16 and 17 recite, inter alia, an ashing method comprising introducing substantially pure oxygen into an internal environment of a processing chamber to a first partial pressure; maintaining the internal environment of the processing chamber at an annealing temperature and introducing a substrate having a first temperature and a resist layer formed thereon into the internal environment of the

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processing chamber allowing the resist to be oxidized as the substrate heats from the first temperature to the annealing temperature between 700°C and 1300°C. Sang – Hun, “Application of Atmospheric Torch Plasma to Resist and Polymer Removals”, Proceedings of the Symposium on Dry process, Tokyo, p. 103 – 108, Nov (2000) teaches a resist oxidation method with pure oxygen at atmospheric pressure, but fails to teach oxidizing at a temperature between 700°C and 1300°C. Additionally, the art of record does not disclose or anticipate the above limitation in combination with other claim elements nor would it be obvious to modify the art of record so as to form a device including the above limitation.

Claims 18 – 20 recite, inter alia, an ashing method comprising providing a substrate having a resist layer formed thereon and placing the substrate into an internal environment of a processing chamber; introducing substantially pure oxygen into the internal environment of the processing chamber at a first partial pressure of between 100 Torr and 1000 Torr, increasing the environment of the processing chamber to a second temperature of between 700°C and 1300°C causing the oxygen to react with the resist layer to oxidize the resist layer. Sang – Hun, “Application of Atmospheric Torch Plasma to Resist and Polymer Removals”, Proceedings of the Symposium on Dry process, p. 103 – 108, Nov (2000), Tokyo teaches a resist oxidation method with pure oxygen at atmospheric pressure, but fails to teach oxidizing at a temperature between 700°C and 1300°C. Additionally, the art of record does not disclose or anticipate the above limitation in combination with other claim elements nor would it be obvious to modify the art of record so as to form a device including the above limitation.

Conclusion

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Nishina, US 5,503,964; Kurimoto, US 6,043,004; Levenson, US 6,231,775 and US 6,599,438 and Kuzumoto, US 6,616,773 teach resist ashing methods.

Kuribayshi, US 6,410,455 teaches a wafer processing system.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Asok Kumar Sarkar

Asok K. Sarkar
July 9, 2004

Patent Examiner